

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
28 July 2005 (28.07.2005)

PCT

(10) International Publication Number
WO 2005/069081 A2

(51) International Patent Classification⁷: **G03F 7/20**,
G02B 27/28, 5/30

(21) International Application Number:
PCT/EP2005/000320

(22) International Filing Date: 14 January 2005 (14.01.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/537,327 16 January 2004 (16.01.2004) US

(71) Applicant (for all designated States except US): **CARL ZEISS SMT AG** [DE/DE]; Carl-Zeiss-Strasse 22, 73447 Oberkochen (DE).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **FIOLKA, Damian** [DE/DE]; Heckenrosenweg 36, 73446 Oberkochen (DE). **DEGUENTHER, Markus** [DE/DE]; Liebigstrasse 2, 73432 Aalen (DE).

(74) Agent: **MÜLLER-RISSMANN, Werner**; Carl Zeiss AG, Patentabteilung, Carl-Zeiss-Str. 22, 73447 Oberkochen (DE).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declaration under Rule 4.17:

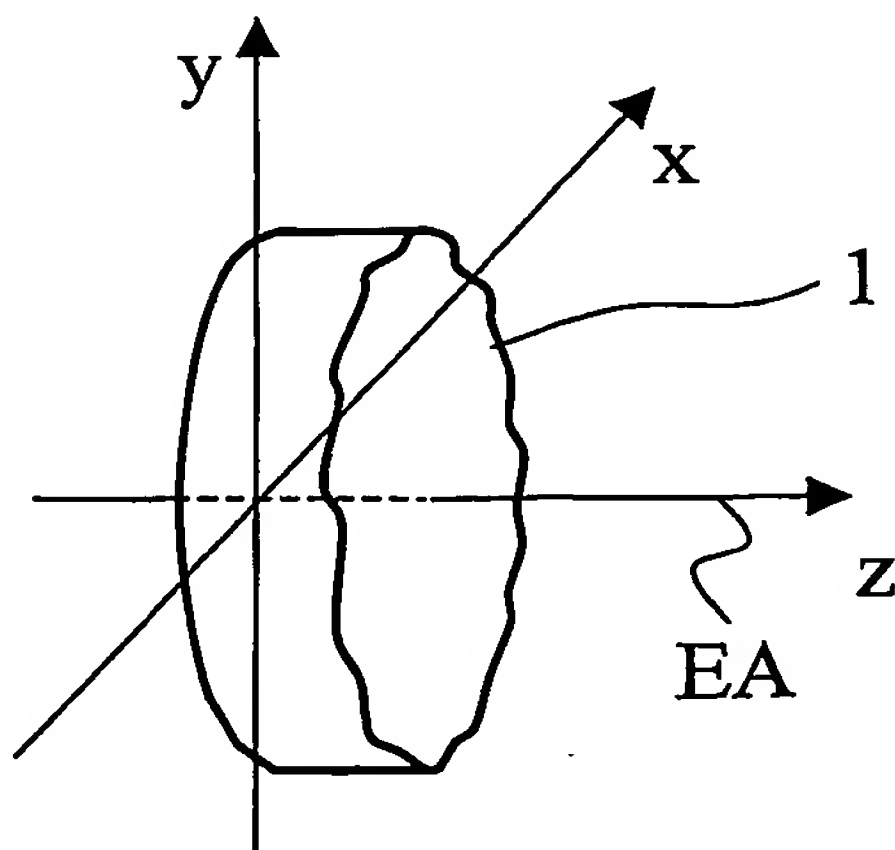
— of inventorship (Rule 4.17(iv)) for US only

Published:

— without international search report and to be republished upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: **POLARIZATION-MODULATING OPTICAL ELEMENT**



(57) Abstract: A polarization-modulating optical element (1) consisting of an optically active crystal material has a thickness profile where the thickness, as measured in the direction of the optical axis, varies over the area of the optical element. The polarization-modulating optical element (1) has the effect that the plane of oscillation of a first linearly polarized light ray and the plane of oscillation of a second linearly polarized light ray are rotated, respectively, by a first angle of rotation and a second angle of rotation, with the first angle of rotation and the second angle of rotation being different from each other.

WO 2005/069081 A2